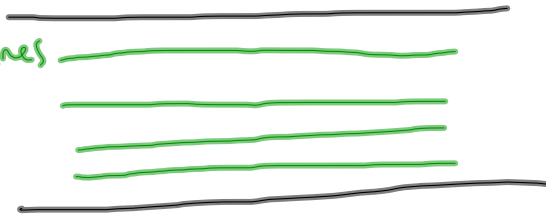


Fluid Dynamics:

• Two types of flow:

1. Laminar \rightarrow smooth

streamlines



- All streamlines are parallel to each other
- All points in fluid have the same velocity

2. Turbulent

- Chaotic motion
- Frequently changing motion

For this course, we only care about laminar flow.

Continuity Equation:

- Density of fluid is not changing
- Relates velocities and pipe diameters together

$$A_1 v_1 = A_2 v_2$$

A = cross-sectional area

v = velocity

Bernoulli's equation:

- Started with Work-energy theorem

$$W = \Delta KE + \Delta PE$$

DERIVATION

$$P_1 + \frac{1}{2} \rho v_1^2 + \rho g y_1 = P_2 + \frac{1}{2} \rho v_2^2 + \rho g y_2$$

Bernoulli's Equation

P = pressure y = height

ρ = density

v = velocity

Bernoulli's Theorem

$$P + \frac{1}{2} \rho v^2 + \rho g y = \text{constant}$$